**Results:** All four investigated splice variants of the primary transcript of Sur gene were expressed in NSCLC and lung tissues and their expression level decreased in the order Sur, Sur-ΔEx3, Sur-2B and Sur-3B. The expression of all studied Sur transcript splice variants was substantially higher in NSCLC tissues as compared to matched lungs. In fact, in 71 (66%), 74 (69%), 79 (74%) and 56 (52%) of 107 examined NSCLC patients the tumors had more than tenfold higher mRNA level of Sur, Sur-ΔEx3, Sur-2B and Sur-3B, respectively, as compared to the lungs. Neither in the tumors nor in the lungs the different genotype (g/g, c/g or c/c) at the position -31 in the repressor element CDE2/CHR of Sur gene promoter had a significant impact on the expression of the investigated Sur transcript splice variants. By contrast, the expression of all studied Sur transcript splice variants in the tumors, but not in the lungs, was significantly higher in smokers than non-smokers.

**Conclusions:** The present study provides evidence that transcripts encoding Sur, Sur-ΔEx3, Sur-2B and Sur-3B are overexpressed in the majority of NSCLC tissues, that the single nucleotide polymorphism at the position -31 in the Sur gene promoter does not significantly influence the level of expression of the Sur transcript splice variants in NSCLC and lung tissues, and that smoking may further increase the upregulated expression of the Sur transcript splice variants in the tumors.

This work was supported by research projects NR/7860-5 and MZO00064211 from the Ministry of Health, Czech Republic.

**P2-132** **BSTB: Tumor and Cell Biology Posters, Tue, Sept 4**

### Anti-proliferative effects of betulin in human lung cancer cells

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**Background:** Induction of apoptosis in cancer cells is one of the targets for the development of potential chemotherapeutic agents. Betulin, a lupne-type triterpene, could be purified in some plant species and had been shown to exert cytotoxic effects in cancer cells. The antiproliferative effect of betulin on lung cancer cells was evaluated in this study.

**Methods:** The cytotoxic and anti-proliferative of betulin to lung cancer cells were evaluated by the MTT assay and trypan blue exclusion assay at three repeated tests. The morphologic changes were monitored under the contrast-enhanced microscope. The apoptotic effects were evaluated by Annexin-V and Hoechst 33342 staining.

**Results:** On our preliminary data for screening the cytotoxicitic effect of several pure compounds purified from plants on lung cancer cells were evaluated. Betulin exhibited cytotoxicitic effect on A549 lung cancer cells. The IC50 values of betulin on A549 cancer cells ranged from 5 to 10 μg/ml after 48 h of treatment. After 72 h of exposure, betulin (10 μg/ml) could significantly reduced A549 cell proliferation to 21 ± 2.8 % of control. Betulin could also induce apoptosis in A549 cancer cells.

**Conclusions:** Betulin could induce apoptosis in human lung cancer cells. We would like to further elucidate the anti-proliferative mechanisms *in vitro* and *in vivo* of betulin to the lung cancer cells.

**P2-133** **BSTB: Tumor and Cell Biology Posters, Tue, Sept 4**

### Identification of novel proteins associated with aryl hydrocarbon receptor expression in human lung cancer cells

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**Background:** Recently we reported that aryl hydrocarbon receptor (AhR) over-expressed in the early stage of lung adenocarcinoma (AD). Furthermore, AhR overexpression promoted anchorage independent growth of lung AD cells. To identify novel proteins associated with AhR overexpression, we compared the protein profiles in parental and AhR interfered AD cells H1355 with the proteomic technique.

**Methods:** AhR expression in AD cells H1355 was reduced with the small RNA technique. Several stable clones of AhR interfered cells were isolated. Differentially expressed proteins in parental cells and AhR interfered cells were identified with two-dimensional gel electrophoresis followed by LC/MS analysis, and then confirmed by Western immunoblot. The relative mRNA levels were determined with the real-time RT-PCR method.

**Results:** A total of 5 proteins were identified with the proteomic technique and confirmed with the Western immunoblot. Among these proteins, the changes in heat shock protein 27 and galectin-1 were the most dramatic. The protein and mRNA levels of these two proteins were negatively correlated with AhR levels in AhR interfered cells and five lung cancer cell lines.

**Conclusions:** These results suggested that AhR level negatively regulate expression of heat shock protein 27 and galectin-1 in lung AD. The role and function of these two proteins in the development of lung AD deserve further investigation in the future.

**P2-134** **BSTB: Tumor and Cell Biology Posters, Tue, Sept 4**

### Expression of gemcitabine-resistance-correlative gene and polymorphism of ribonucleotide reductase M1 gene promoter in A549/Gem and H460/Gem cell lines with gemcitabine resistance

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**Background:** To assay expression of CDA, RRM1, PTEN, ERCC1, dCK and RRM1(-)37A/C polymorphism which have been shown relevant to gemcitabine resistance in two human gemcitabine-resistant non-small cell lung cancer cell lines A549/Gem and H460/Gem so as to make clear how do they vary during the course of acquiring resistance to gemcitabine.

**Methods:** Taking the human gemcitabine-resistant non-small cell lung cancer cell lines A549/Gem and H460/Gem which were established by repeated clinical serous peak concentration then low but gradually increasing concentration of gemcitabine in our department as experimental objects, we used real-time fluorescent quantitative RT-PCR to examine expression of CDA, RRM1, PTEN, ERCC1, dCK and RRM1(-)37A/C polymorphism at the different time point during introduction process.